Agenda
Field Work Scoping Meeting - Northeast Cape

The Issue

On March 13, 1998, a meeting was held at the Alaska District offices to discuss comments on Montgomery Watson's Phase II RI/Feasibility Study (draft) dated December 6, 1996, for Northeast Cape, St. Lawrence Island, Alaska. The comments were from Katarina Rutkowski, Environmental Specialist, Alaska Department of Environmental Conservation (ADEC), dated May 8, 1997. In attendance at the meeting were Rich Jackson, Guy McConnell, Suzanne Beauchamp, and Dee Ginter of the Alaska District, Katarina Rutkowski of the ADEC, and Victor Harris and Douglas Quist of Montgomery Watson.

The conclusions reached during this meeting formed the basis of the field work planned at Northeast Cape during the summer of 1998, for which a work plan is in progress. However, one unresolved issue is Sites 10, 11, 13, 15, 27, 19, 27: These sites are all similar because 1) they are adjacent, 2) they are in similar soil environments (gravel fill over native soils) 3) they have similar contaminant types (generally diesel, some PCBs), and 4) they may act as continuing sources of contamination to the "drainage basin". During the March 13 meeting, it was decided that at these sites we should 1) delineate the extent of contamination (fill data gaps as required), 2) evaluate the extent to which these sites act as continuing source areas, and 3) gather engineering data necessary to perform a technology screen to remediate diesel contamination (for example: air permeability, hydraulic conductivity, engineering characteristics).

We need to make some fundamental decisions on what remedial action(s) are being considered at these sites so that we gather any necessary field data required to achieve site closure.

Summary of Existing Site Data

Table 1 summarizes the concentrations of contaminants of concern soil and groundwater at Sites 13, 15, 19, and 27. DRO is found in subsurface soils as high as 16,000 mg/kg at a depth of 3 feet, and 13,300 mg/kg at 10 feet. GRO reaches 1,300 mg/kg at 3 feet and 6,650 at 5 feet. TRPH is found as high as 28,800 mg/kg at 5 feet.

In groundwater, DRO is found as high as 34 mg/l, GRO at 6.1 mg/l, and benzene at 0.120 mg/l. These contaminants stem from leaked fuel from USTs, ASTs, filling operations, and broken fuel lines on the fill pad of the main operations complex.

Sample locations, and a subsurface cross-section of Sites 13, 15, 19, and 27 are shown on Figure 1 and 2.

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1200C PERM

Similar data for Sites 10 and 11 are given in Table 2 and Figures 3 and 4. In these areas, DRO, GRO, and benzene are also elevated, but are probably restricted to shallower zones due to shallow groundwater and frozen soils.

Potential Receptors and Pathways

Current potential receptors and pathways at the site have been identified as:

- Seasonal exposure to surface soils by fish camp inhabitants and occasional visitors
- Surface soil exposure by ecological receptors (e.g., wildlife)
- Consumption by nearby residents of subsistence food sources impacted by surface water and sediment contamination (e.g., fish, mollusks)
- Consumption by nearby residents of subsistence food sources impacted by surface soil contamination (e.g., caribou, berries)

Additionally, theoretical future receptors and pathways could include:

- Future use of ground water as a drinking water source for a theoretical future resident
- Surface soil exposure by a theoretical future resident
- Excavation and use of subsurface soils as surface soils

The May 4, 1998 adoption draft of the Alaska Oil and Hazardous Substances Pollution Control Regulations (18 AAC 75) requires that

- soil cleanup standards must be based on estimates of the reasonable maximum exposure expected to occur under current and future site conditions (18 AAC 75.340)
- cleanup of ground water meet the cleanup standards set in 18 AAC 75.345 if the current use or the reasonably expected potential future use of the groundwater is a drinking water source. Cleanup to ten times the standards in 18 AAC 75.345

The May 4, 1998 adoption draft details some specific criteria for determining future land use and determining whether subsurface water can be considered a drinking water source.

Remediation Objectives

Selection of remedial technologies will be driven be the remedial objectives set for the site. Remedial objectives are typically developed from an readily-understandable, comprehensive objective related to the effects on the people and wildlife potentially impacted by the site. Once consensus is reached on the conceptual objectives, quantitative criteria are identified that will be used to objectively measure whether the remedial objective has been successfully met.

Some potential objectives for each media are listed below in order to initiate discussion and work toward resolution.

Ground Water

- No observable aesthetic impacts at the boundary of the pad
    - Threshold odor number (TON) of 1 (by Method 2150B)
    - Flavor Threshold Number (FTN) of 1 (by Method 2160B)
    - Petroleum sheen
- Restoration to drinking water standards throughout the site
    - Maximum contaminant levels (18 AAC 75.345)
    - Threshold odor number (TON) of 1 (by Method 2150B)
    - Flavor Threshold Number (FTN) of 1 (by Method 2160B)
- Restoration to fresh or salt water quality criteria (18 AAC 70) at the boundary of the gravel pad;
- Ten times the drinking water standards at the boundary of the gravel pad (18 AAC 75.345(b)(2))

Surface water and sediments

- Fresh or salt water quality criteria (18 AAC 70)
- Restoration to conditions in a comparable reference stream (e.g., diversity, productivity)
- No observable adverse effect on the quality and quantity of subsistence food sources

Surface Soils

- ADEC soil cleanup matrix levels (18 AAC 75. Table A1 or A2, May 4, 1998 Adoption Draft, Method 1)

- ADEC Soil Screening levels (18 AAC 75. Table B1, May 4, 1998 Adoption Draft , Method 2)

- ADEC Site Specific Cleanup levels (18 AAC 75. May 4, 1998 Adoption Draft , Method 3)

Subsurface soils

- ADEC soil cleanup matrix levels (18 AAC 75. Table A1 or A2, May 4, 1998 Adoption Draft, Method 1)

- ADEC Soil Screening levels (18 AAC 75. Table B1, May 4, 1998 Adoption Draft , Method 2)

- ADEC Site Specific Cleanup levels (18 AAC 75. May 4, 1998 Adoption Draft , Method 3)

Identifying an acceptable time frame for achievement of the remedial objectives is an important decision. Understanding acceptable short-term impacts on the quality of life for potentially-impacted people and wildlife and the tolerance of potentially-impacted communities for the time frame for achieving the long-term objectives is critical in selecting acceptable remediation technologies.

Once remediation objectives have been set, the list of potential remediation strategies can be narrowed and projection made on the effectiveness, cost and feasibility of various options.

Participants in the objective-setting process is may change depending on the remedial objectives. Stringent objectives may not require significant participation by some parties. Typically, objectives are set and agreed to by the responsible party, ADEC, land owner, residents, community, and Fish and Game, if fish and game is potentially impacted.

Potential Remedial Actions

This section lists some potential remedial actions. However, it is premature to discuss remedial options, if the remedial objectives for the site are not clearly identified.

Surface water and sediments

- Contaminant source removal and natural or accelerated recovery

- Excavate and treat or dispose of contaminated sediments
- Redirect creek then remediate abandoned creek bed to some surface soil standards

Surface Soil on Pad

- Cap (native soils or low permeability clay)
- Landfarm
- Biovent
- Bioslurping
- Solvent or surfactant flushing
- Excavate and thermal desorption

Subsurface soil on Pad

- Freezeback and revegetate
- Steam Injection
- Bioslurping
- Solvent or surfactant flushing
- Excavate and thermal desorption

Ground water

- Institutional controls (i.e., deed restriction on groundwater use and provision to provide drinking water to any future residents)
- Containment
- Freezeback
- Pump and biotreat

- Pump and air strip
- In situ biotreatment

Minimum Required Data

The minimum data requirements can be defined once the remedial objectives have been set. Data requirements can be grouped into categories and collection of data time-phased to minimize cost. The first category of data is that required to determine whether or not the remedial objectives (once identified) are currently met or not. For example, the presence or absence of impacts on ecological receptors in the drainage basin. Also, identification of the source and significance of contamination and its migration. For example, visual signs of migration from the pad to the drainage basin (e.g., seeps) and temperature profile in the pad and adjoining areas (e.g., thermistor data).

A complete list of data falling into this category will be dependent on the remedial objectives. For example, if the remedial objectives for the site include restoration of all groundwater to drinking water standards, then investigation of the extent of contamination in the soils and ground water underlying the pad is necessary. If the remedial objective is the impact of the groundwater on hydraulically-connected surface water, then extensive delineation of the soil and ground water contamination may be replaced with a simple investigation of the ground water migration patterns and thermal profile.

The second category of data includes the data necessary for selecting, estimating costs and designing remediation strategies. Although incomplete, this list could include data such as:

- Hydraulic conductivity - regional and local
- Soil Characteristics
- Water treatment criteria - hardness, iron, sulfates, TSS, etc.
- Profiles of media and contaminants in the pad and adjoining areas
- Natural attenuation parameters
- Depth to permafrost or other confining layer

TABLE 1

Summary of Areas of Concern
Site 13, 15, 19, 27
Northeast Cape
St. Lawrence Island, Alaska

Site		Analyte	Sampling Location/Depth in feet (Sample Number)	Units	Maximum Concentration	Applicable Benchmark Criteria	Risk Based Criteria (1)	Volume (Cubic Yards)	Comments
Sediment and Surface Water									
27		Diesel Range Organics	SW/SD107 (27107SD)	mg/kg	38,600	none	none		
27		Diesel Range Organics	SW/SD107 (27107SW)	mg/l	2.3	0.005 (3)	none		
27		TRPH	SW/SD107 (27107SD)	mg/kg	38,600	none	none		
27		TRPH	SW/SD107 (27107SW)	mg/l	2.3	none	none		
Soil									
13		Diesel Range Organics	BH13-3/9-5-11.5(13126SB)	mg/kg	10,800	100 (4)	8,760 (11)	80	Volume applies to DRO/TRPH contaminated soil associated with UST and AST in Area 13
15		Diesel Range Organics	MW 15-1/9.5-11.5 (15127SB)	mg/kg	2190	100 (4)	8,760 (11)	4,925	Volume applies to DRO/TRPH contaminated soil associated with UST, pump island, and fuel line spill in Areas 13,15,19,27
15		Diesel Range Organics	SS149/0.5(15249SS)	mg/kg	7,610	100 (4)	8,760 (11)		
19		Diesel Range Organics	MW 19-1/9.5-11.5(19116SB)	mg/kg	13,300	100 (4)	8,760 (11)	5,057	Volume applies to DRO/TRPH contaminated soil associated with vehicle maintenance/storage facilities in Area 19
27		Diesel Range Organics	MW 27-1/2-4(27318SB)	mg/kg	16000 J	100 (4)	8,760 (11)		
27		Diesel Range Organics	SS180/0.5(27180SS)	mg/kg	37,900	100 (4)	8,760 (11)		
13		Gasoline Range Organics	BH 13-3/9.5-11.5 (13126SB)	mg/kg	225 Jo	50 (4)	5,260		
19		Gasoline Range Organics	MW 19-1/4-6 (19115SB)	mg/kg	6,650	50 (4)	5,260		
27		Gasoline Range Organics	MW 27-1/2-4(27318SB)	mg/kg	1300 Jo	50 (4)	5,260		
27		Gasoline Range Organics	SS181/0.5 (27181SS)	mg/kg	370	50 (4)	5,260		
13		TRPH	BH 13-3/9.5-11.5(13126SB)	mg/kg	7,880	2,000 (10)	none		
13		TRPH	SS144/0.5(13144SS)	mg/kg	6,130	2,000 (10)	none		
15		TRPH	SS149/0.5(15149SS)	mg/kg	36,800	2,000 (10)	none		
19		TRPH	MW 19-1/4-6(19115SB)	mg/kg	28,800	2,000 (10)	none		
19		TRPH	SS154/0.5(19154SS)	mg/kg	16,600	2,000 (10)	none		
27		TRPH	BH 27-2/0-2 (27121SB)	mg/kg	32,400	2,000 (10)	none		
27		TRPH	SS181/0.5(27181SS)	mg/kg	66,400	2,000 (10)	none		
19	Metals	Chromium	SS150/0.5 (19150SS)	mg/kg	59	50 (5)	390		
19		Copper	MW 19-1/9.5-11.5(19116SB)	mg/kg	27	24 (5)	2,900		
19		Copper	SS154/0.5919154SS)	mg/kg	65	24 (5)	2,900		
19		Zinc	SS150/0.5 (19150SS)	mg/kg	282	84 (6)	23,000		
13	PCBs	Aroclor 1260	SS145/0.5 (13145SS)	ug/kg	58,300	1,000	none		
Water									
13		Diesel Range Organics	MW 13-1 (13106GW)	mg/l	23	0.5 (4)	none		
15		Diesel Range Organics	MW 15-1 (15108GW)	mg/l	9.3	0.5 (4)	none		
19		Diesel Range Organics	MW19-2(19117GW)	mg/l	34	0.5 (4)	none		
27		Diesel Range Organics	MW 27-1(27305GW)	mg/l	3.8 BL	0.5 (4)	none		
13		Gasoline Range Organics	MW 13-1 (13106GW)	mg/l	4	0.5 (4)	none		
19		Gasoline Range Organics	MW 19-1 (19104GW)	mg/l	6.1	0.5 (4)	none		
27		Gasoline Range Organics	MW 27-1(27205GW)	mg/l	1.9	0.5 (4)	none		
13		TRPH	MW 13-1 (13106GW)	mg/l	190	0.5 (10)	none		
15		TRPH	MW 15-1 (15108GW)	mg/l	31	0.5 (10)	none		
19		TRPH	MW 19-1 (19104GW)	mg/l	9.7	0.5 (10)	none		
27		TRPH	MW 27-1(27205GW)	mg/l	2.6	0.5 (10)	none		

TABLE 1

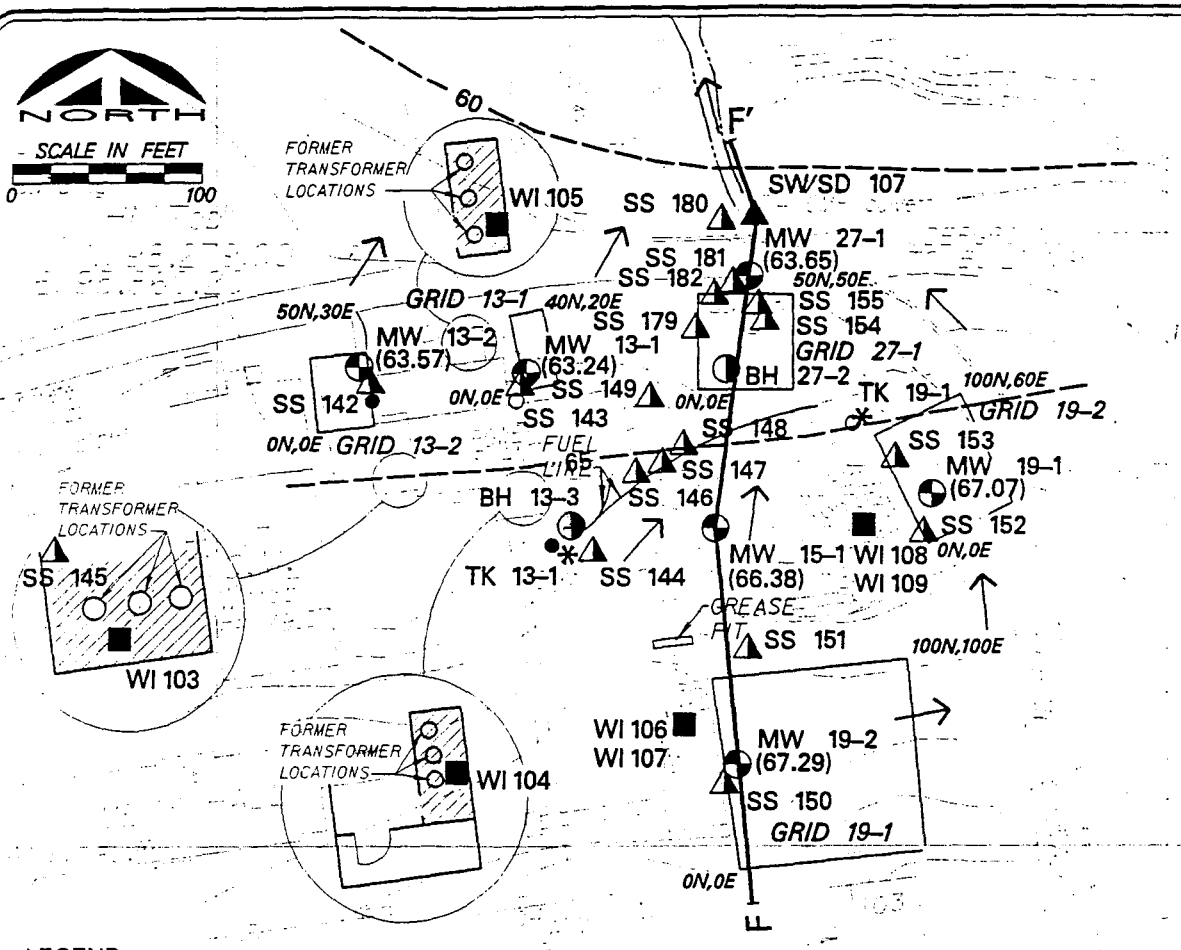
Summary of Areas of Concern
Site 13, 15, 19, 27
Northeast Cape
St. Lawrence Island, Alaska

Site		Analyte	Sampling Location/Depth in feet (Sample Number)	Units	Maximum Concentration	Applicable Benchmark Criteria	Risk Based Criteria (1)	Volume (Cubic Yards)	Comments
13	VOCs:	Benzene	MW 13-2 (13107GW)	ug/l	120 Jo	5.0 (2,3)	0.36		
19		Benzene	MW 19-1 (19104GW)	ug/l	25	5.0 (2,3)	0.36		
27		Benzene	MW 27-1(27205GW)	ug/l	5.6	5.0 (2,3)	0.36		
13	Metals:	Arsenic	MW 13-1 (13106GW)	mg/l	.073, .011d	0.05 (2,3)	0.011		
15		Arsenic	MW 15-1 (15108GW)	mg/l	0.11	0.05 (2,3)	0.011		
15		Beryllium	MW 15-1 (15108GW)	mg/l	0.02	0.004 (3)	0.00016		
13		Chromium	MW 13-1 (13106GW)	mg/l	0.24	0.1 (2,3)	0.18		
13		Lead	MW 13-1 (13106GW)	mg/l	0.45	none	none		
15		Lead	MW 15-1 (15108GW)	mg/l	0.68	none	none		
19		Lead	MW 19-1 (19104GW)	mg/l	0.42	none	none		
27		Lead	MW 27-1(27205GW)	mg/l	0.21	none	none		
13		Lead, Dissolved	MW 13-2 (13107GW)	mg/l	0.015	none	none		
27		Lead, Dissolved	MW 27-1(27305GW)	mg/l	0.0085	none	none		
19		Magnesium	MW 19-2 (19117GW)	mg/l	9.5	none	none		

KEY:

BH - Borehole
BNA - Base/neutral/acid extractables
D/Fs - Dioxin/Furans
GW - Groundwater
mg/kg - Milligrams per kilogram
mg/l - Milligrams per liter
MW - Monitoring well
NA - Not Applicable
PCB - Polychlorinated biphenyls
ppt - Parts per trillion
SB - Soil boring
SD - Sediment
SS - Surface soil
SW - Surface water
TRPH - Total recoverable petroleum hydrocarbons
ug/kg - Micrograms per kilogram
ug/l - Micrograms per liter
VOC - Volatile organic compounds
BL - Value attributed to blank or lab contamination
J- Value estimated
Jo- Value overestimated

1. Risk-based concentrations for residential soils and tapwater, "Risk-based Concentration Table," November 8, 1994, EPA Region III.
2. Federal Drinking Water Maximum Contaminant Levels, 40 CFR 141, Subpart F.
3. Alaska State Drinking Water Maximum Contaminant Levels, 18 AAC 80.
4. Numerical Soil Cleanup Targets for Petroleum, "Interim Guidance for Non-UST Contaminated Soil Cleanup Levels (Revision 1), "July 17, 1991, ADEC.
5. "Elemental Concentrations in Soils and Other Surficial Material of Alaska," 1988 U.S. Geological Survey.
6. Background levels found at the NEC site, Appendix G.
7. PCB action Level for residential soil and 1% organic carbon sediments, identified in the EPA Publication 9355.4-01 FS, "A Guide on Remedial Actions at Superfund Sites with PCB Contamination," August 1990
8. "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, OSWER Directive # 9355.4-12, IEUBK model.
9. Toxic Substances Control Act, 40 CFR 761.125.
10. Nonregulatory benchmark criteria.
11. Calculated risk-based concentrations for residential soil ingestion, utilizing equations found in, "Risk-based Concentration Table," November 8, 1994, EPA Region III. The RfDo value for diesel found in the March 24, 1992 memorandum from Joan S. Dollarhide, Associate Director, Superfund Health Risk Technical Support Center, Chemical Mixtures Assessment branch, to Carol Sweeney, USEPA, Region X.



LEGEND

- Borehole (BH)
- Monitoring Well w/Groundwater Elevation (MW)
- Surface Soil Sample (SS)
- Surface Water/Sediment Sample (SW/SD)
- Surface Water Elevations (ft, MSL)
- HAZCAT Sample (TK)
- AST
- UST
- Wipe Sample (WI)
- Location of Geologic Section
- Groundwater Contour (estimated)
- Surface Water Flow Direction
- Stained Area

NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers. (See Section 2.5)

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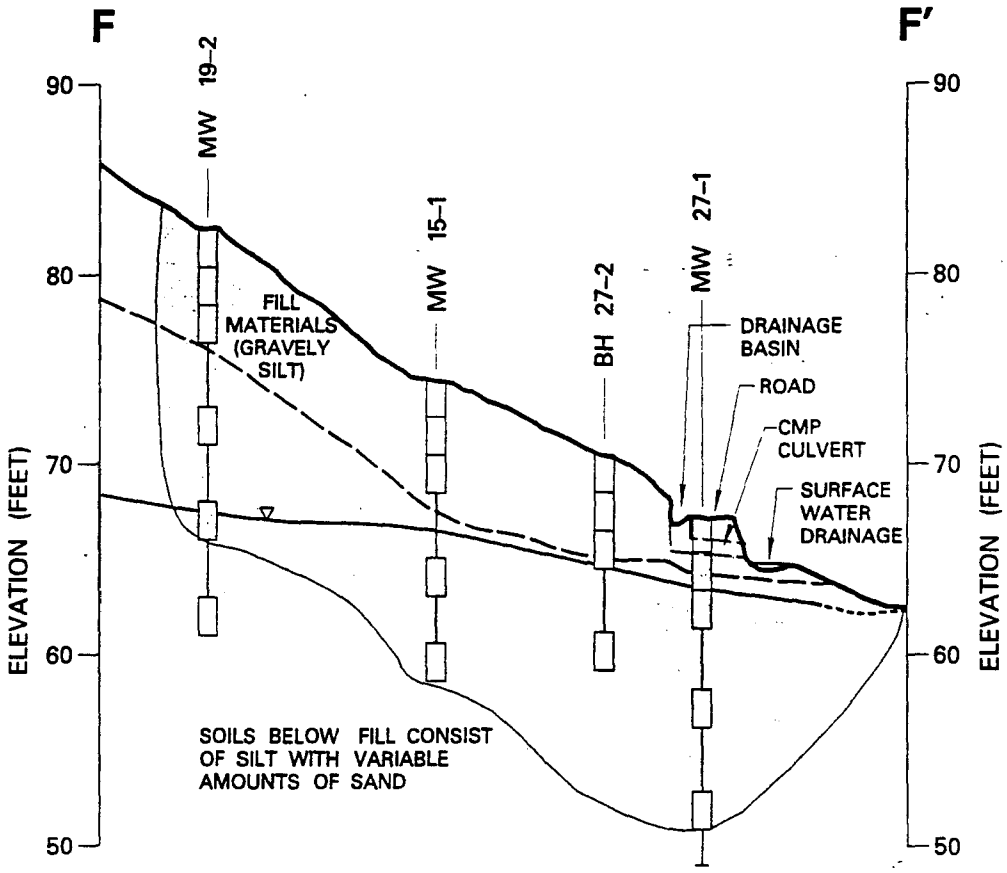
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 4

ALASKA DISTRICT - CORPS OF ENGINEERS
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITES 13, 15, 19 & 27 GEOPHYSICAL GRIDS AND HYDROGEOLOGY REFERENCE MAP



LEGEND

- Surface Topography (Dashed where uncertain)
- Geologic Boundary (Queried where uncertain)
- Water Table (Dashed where uncertain)
- Potential extent of POL contamination above benchmark criteria >100mg/kg DRO or > 1,000 mg/kg TRPH
- BH 1-1 — Borehole Location Showing Sample Interval

SCALE:
1" = 10' VERT.
1" = 100' HOR.

VERTICAL EXAGGERATION = 10X

MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2

ALASKA DISTRICT - CORPS OF ENGINEERS
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITES 13, 15, 19 & 27
SECTION F-F'

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TABLE 2

Summary of Areas of Concern
Site 10, 11
Northeast Cape
St. Lawrence Island, Alaska

Site		Analyte	Sampling Location/Depth in feet (Sample Number)	Units	Maximum Concentration	Applicable Benchmark Criteria	Risk Based Criteria (1)	Volume (Cubic Yards)	Comments
10	VOCs	1,3,5-Trimethylbenzene	BH 10-2/0-2 (10303SB)	ug/kg	39 J	none	none		
10	Metals	Copper	BH 10-3/0-2 (10104SB)	mg/kg	34	24 (5)	2,900		
10		Copper	SS127/0.5 (10127SS)	mg/kg	35	24 (5)	2,900		
10		Nickel	BH 10-3/0-2 (10104SB)	mg/kg	25	24 (5)	1,600		
10		Zinc	BH 10-3/0-2 (10104SB)	mg/kg	140	84	23,000		
10		Zinc	SS127/0.5 (10127SS)	mg/kg	183	84 (6)	23,000		
10		Beryllium	MW 10-1/4-6 (10102SB)	mg/kg	1.8	1.5 (5)	0.15		
10	PCBs	Aroclor 1254	BH 10-2/0-2 (10203SB)	ug/kg	2170 Ju	1,000 (7)	none		
Water									
10		Diesel Range Organics	MW 10-4 (10103GW)	mg/l	3.2	0.005 (3)	none		
11		Diesel Range Organics	MW 11-3 (11101GW)	mg/l	6.1	0.005 (3)	none		
11		TRPH	MW 11-3 (11101GW)	mg/l	6.6	none	none		
10		Lead	MW 10-1 (10102GW)	mg/l	0.2	none	none		
11		Benzene	MW 11-3 (11101GW)	ug/l	10	5.0 (2,3)	0.36		
11		n-Propylbenzene	MW 11-3 (11101GW)	ug/l	16	none	none		

KEY:

BH - Borehole
BNA - Base/neutral/acid extractables
D/Fs - Dioxin/Furans
GW - Groundwater
mg/kg - Milligrams per kilogram
mg/l - Milligrams per liter
MW - Monitoring well
NA - Not Applicable
PCB - Polychlorinated biphenyls
ppt - Parts per trillion
SB - Soil boring
SD - Sediment
SS - Surface soil
SW - Surface water
TRPH - Total recoverable petroleum hydrocarbons
ug/kg - Micrograms per kilogram
ug/l - Micrograms per liter
VOC - Volatile organic compounds
J- Value estimated
Ju- Value underestimated

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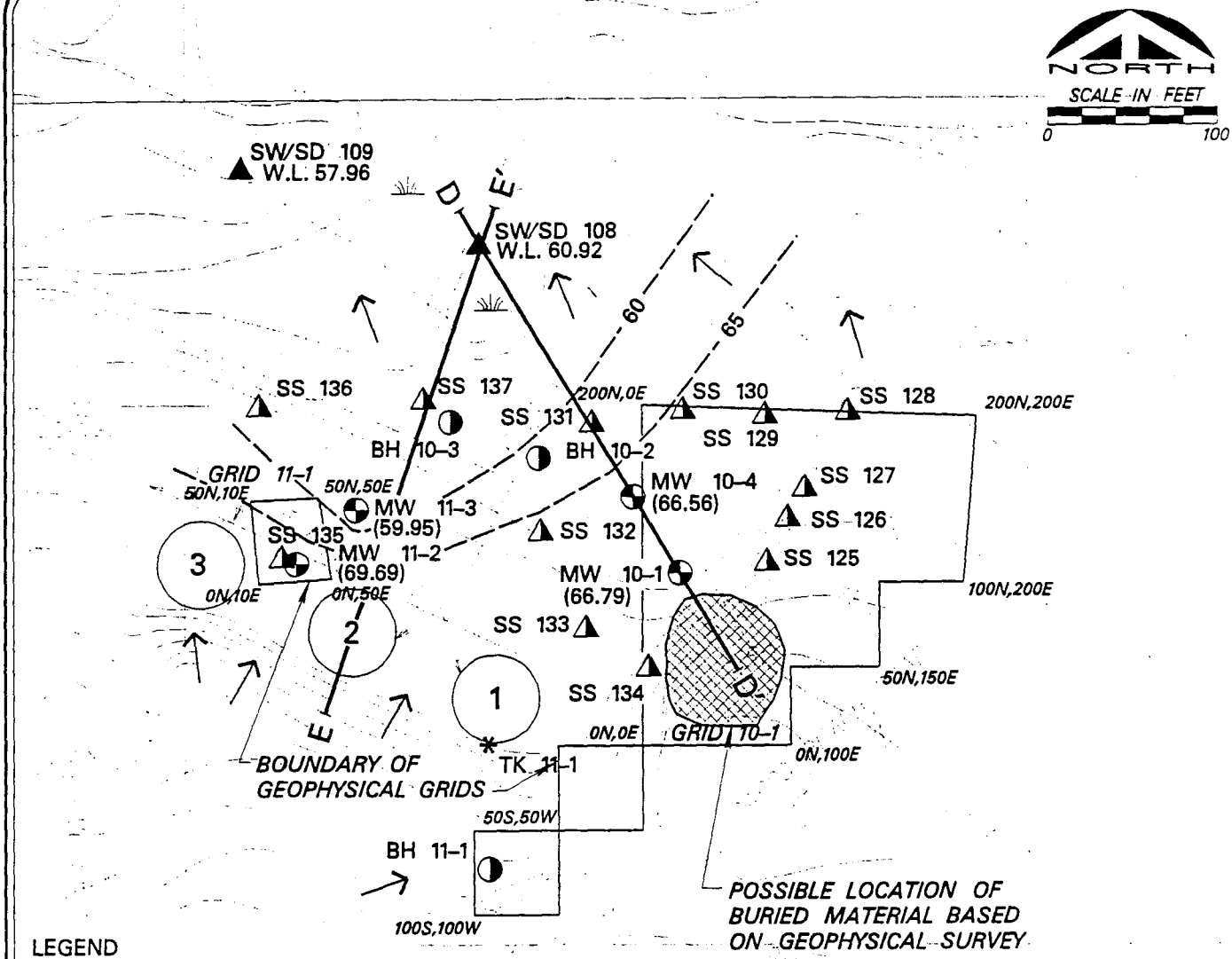
Sediment and Surface Water									
10		Diesel Range Organics	SW/SD109 (10109SD)	mg/kg	38,000	none	none		
10		Diesel Range Organics	SW/SD110 (10110SW)	mg/l	14	none	none		
10		Gasoline Range Organics	SW/SD108 (10108SD)	mg/kg	220	none	none		
10		Gasoline Range Organics	SW/SD110 (10110SW)	mg/l	0.92	none	none		
10		TRPH	SW/SD108 (10108SD)	mg/kg	127,000	none	none		
10		TRPH	SW/SD110 (10210SW)	mg/l	19	none	none		
10	VOCs:	Benzene	SW/SD108 (10108SD)	ug/kg	50	none	none		
10		Toluene	SW/SD108 (10108SD)	ug/kg	370	none	none		
10		Xylenes, total	SW/SD108 (10108SD)	ug/kg	780	none	none		
10	Metals:	Cadmium	SW/SD110 (10310SD)	mg/kg	0.87	none	none		
10		Lead	SW/SD110 (10210SD)	mg/kg	63	12 (5)	none		
10		Lead	SW/SD110 (10210SW)	mg/l	0.11	none	none		
10		Lead, Dissolved	SW/SD110 (10210SW)	mg/l	0.018	none	none		
10		Thallium	SW/SD110 (10310SD)	mg/kg	0.32	none	none		
10	PCBs:	Aroclor 1254	SW/SD110 (10110SD)	ug/kg	5160 Ju	none	none		
10		Aroclor 1260	SW/SD110 (10110SD)	ug/kg	1350 Ju	none	none		
10		Aroclor 1260	SW/SD110 (10110SW)	ug/l	1.6	0.0000005 (3)	0.0076		
Soil									
10		Diesel Range Organics	BH 10-2/0-2 (10103SB)	mg/kg	81,300	100 (4)	8,760 (11)		
10		Diesel Range Organics	SS132/0.5 (10132SS);	mg/kg	35,800	100 (4)	8,760 (11)		
11		Diesel Range Organics	MW 11-3/9.5-11.5 (11112SB)	mg/kg	22,000	100 (4)	8,760 (11)		
11		Diesel Range Organics	SS137/0.5 (11137SS)	mg/kg	22,600	100 (4)	8,760 (11)		
10		Gasoline Range Organics	BH 10-2/0-2 (10303SB)	mg/kg	230	50 (4)	5,260		
10		Gasoline Range Organics	SS132/0.5 (10132SS)	mg/kg	120	50 (4)	5,260		
11		Gasoline Range Organics	MW 11-3/9.5-11.5 (11112SB)	mg/kg	192	50 (4)	5,260		
10		TRPH	BH 10-2/0-2 (10103SB)	mg/kg	104,000	2,000 (10)	none		
10		TRPH	SS127/0.5 (10127SS)	mg/kg	119,000	2,000 (10)	none		
11		TRPH	MW 11-3/9.5-11.5 (11112SB)	mg/kg	29,200	2,000 (10)	none		
11		TRPH	SS137/0.5 (11137SS)	mg/kg	80,400	2,000 (10)	none		



LEGEND

- Borehole (BH)
- Monitoring Well w/Groundwater Elevation (MW)
- Surface Soil Sample (SS)
- Surface Water/Sediment Sample (SW/SD)
- W.L. Surface Water Elevations (ft, MSL)
- HAZCAT Sample (TK)
- AST
- UST
- Wipe Sample (WI)
- Location of Geologic Section
- Groundwater Contour (estimated)
- Surface Water Flow Direction

NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers. (See Section 2.5)

MONTGOMERY WATSON

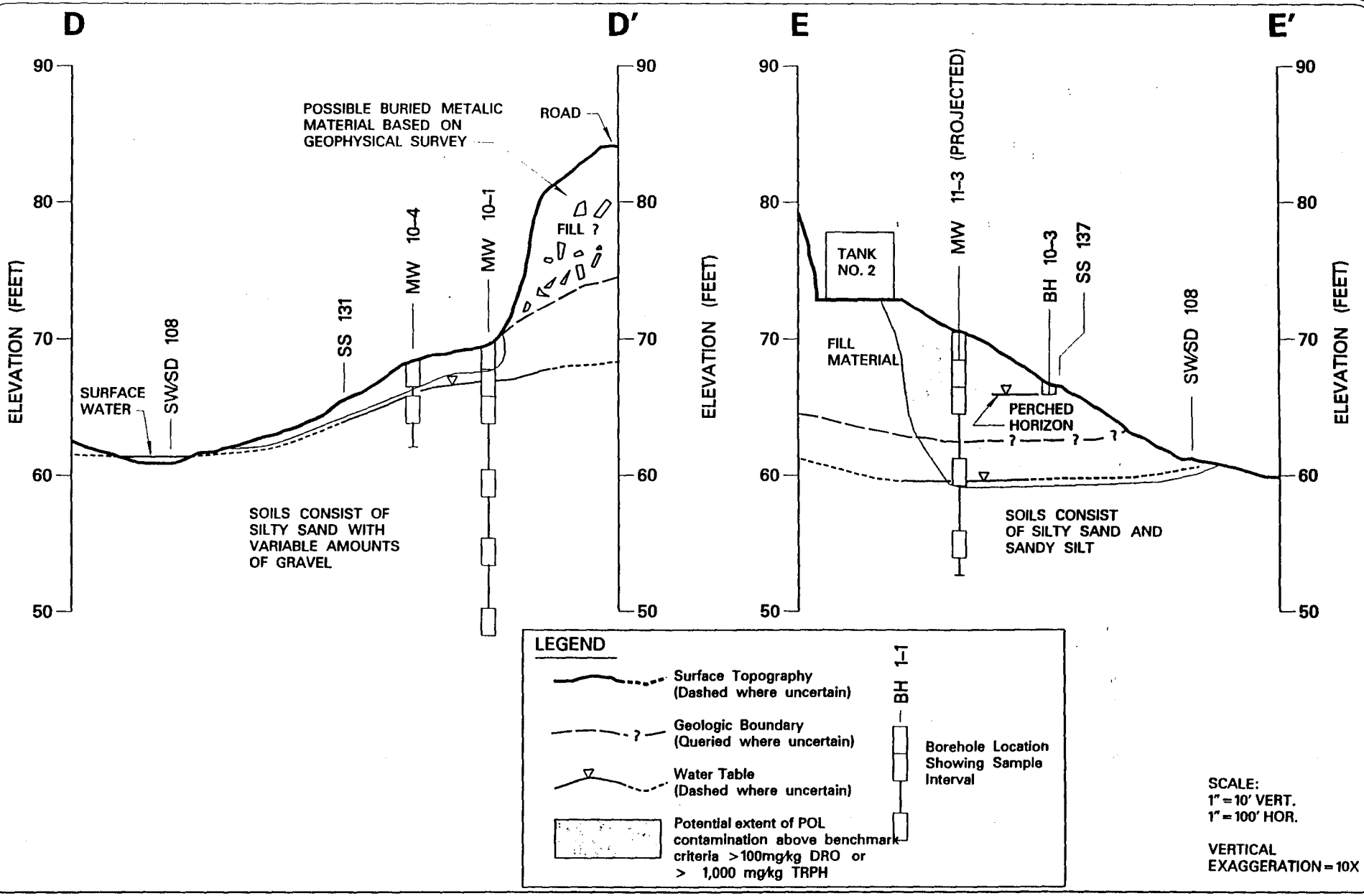
Anchorage, Alaska

FIGURE 3

ALASKA DISTRICT – CORPS OF ENGINEERS
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 10 & 11 GEOPHYSICAL GRIDS AND HYDROGEOLOGY REFERENCE MAP

JOB No. 2198.022 TIME: 02-FEB-1995 16:29 FILE: /usr3/corps/necape/fg4-7-1.dgn



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 4

ALASKA DISTRICT - CORPS OF ENGINEERS
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE 10
SECTIONS D-D' & E-E'